BOTANICA

EUPHORBIACEAE NOVAE VEL CRITICAE COLOMBIANAE, IV.

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Croton Linnaeus

Subsect. *Palanostigma* Mart. in Baill., descr. emend.

Arbores saepissime, plerumque magnae. Foliis indumento stellato tomentosis vel scabridis, numquam argenteis vel revera lepidotis, saepius ovatis, margine parcius denticulatis subintegrisve, lobulis interdum auctis 3-lobisve, pro more generis magnis (i. e., ultra quam 10 cm. longis latisque), penninerviis at primo jugo saepissime maximo, latere ramoso. Calyce ♀ sub anthesi plus minusve cupuliformi, lobis late triangularibus ovarium saepissime cum base stylorum occultantibus, sub fructu bene accrescente.

Species typica: *Croton palanostigma* Kl.

As conceived by its author Baillon (Et. Gén. Euph. 358. 1858), and later treated by Mueller-Argoviensis (in DC. Prodr. 15^2: 524. 1866), this Subsection included a number of unrelated species. As here defined, this group strictly refers to species: (a) Neither silvery nor truly lepidote *in the foliage;* the ♀ perianth may appear a times as if "metallic", but the foliage is never so; (b) With ovate, sometimes 3-lobed leaves, the first pair of veins being generally more evolute than the others, and much branched at the sides; (c) With a large cupuliform ♀ calyx, having broadly triangular lobes, distinctly accrescent in fruit. These three main notes separate the Subsect. ***Palanostigma*** from every other group in its affinity.

The classification of *Croton,* in my considerate opinion, can better be handled at this stage of inquiry by granting recognition to narrow groups of related species in a subsectional or sectional rank rather than by attempting a full-fledged disposition of all its species. Aside from the fact that material and data are not yet available for a full study, *Croton* consists of very numerous, more or less comprehensive groups of species, which have evolved from a common ancestor, and are readily seen to be very closely allied. If these narrow groups are neglected, and an attempt is made to form larger units, taking, for instance, the accrescent ♀ calyx as a main character, the inevitable result is to establish artificial aggregates of very different habit, and with almost no value in taxonomy. Since the ties binding the subsections or sections of *Croton* together are essentially *phylogenetic,* it stands to reason that the correct definition of subsections and sections must precede that of higher units.

The Subsect. *Palanostigma* is essentially Amazonian in its range, and fairly well represented in Colombia. The adjoining treatment is intented to present a comprehensive background for further study in the ranges mentioned, with possible additions from Peru and Brazil outside the Amazonas, and Central America.

Croton palanostigma Kl . in Hook. Jour. Bot. 2: 48-49. 1843; Muell.-Arg. in DC. Prodr. 15^{2}. 538. 1866; in Mart. Fl. Bras. 11^{2}: 106 pl. xx. 1873.

Croton Benthamianus Muell.-Arg. in Mart. Fl. Bras. 11^{2}: 106. 1873. *Syn. nov.*

The type-specimens listed by Klotzsch are: (a) *Schomburgk 1008,* rio Padawire (= Padauiri); (b) *Martius s. n.,* Tapura, in woods. The former, of which I have available a duplicate here, I accept as *lectotype.* There is no doubt as to *C. Benthamianus* being a synonym of *C. palanostigma,* because Mueller-Argoviensis even cites *Schomburgk 1008,* and *Martius s. n.* "In provincia de Alto Amazonas, in silvis Japurensibus" under *C. Benthamianus* at publication. When writing the Euphorbiaceae for Martius's Flora Brasiliensis, Mueller-Argoviensis appears not to have critically studied the material and publications already used, and effected, in De Candolle's Prodromus. Accordingly, the Flora Brasiliensis cannot be trusted at face value.

This species is widespread in the Amazonian basin. The leaves are often grayish-tomentellous underneath, although not thickly so, blackish brown or brown above when dry. The glands at the base of the blade are sessile, patelliform; minute similar glands are scattered on the upper surface of the blade. I have dissected only a few flowers, learning that the lobe of the ♀ perianth when in flower is about twice as wide as long (4 x 2 mm.). The style branch is 2-partite, each arm being 4-6-laciniate. The stamen is dilated at the filament, about 3.5 - 4 mm. long, that is, almost as long as the petal of the ♂ flower. I have seen the following collections: *Schomburgk 1008,* mouth of the Padauiri into the Rio Negro (*); *Ducke 383,* Manáos, Estrada da Raiz; *Krukoff 1326,* Matto Grosso, near Tabajara, upper Machado River region; *Krukoff 8562,* São Paulo de Olivença near Palmares, Amazonas.

Croton cearensis Baill. in Adansonia 4: 328. 1864; Muell.-Arg. in DC. Prodr. 15^2: 537. 1866; in Mart. Fl. Bras. 11^2: 106. 1873. (Non *C. cearensis* Muell.-Arg. in Linnaea 34: 119. 1865, qui *C. betaceus* Baill. est).

The type specimen is *Gardner 1008,* fragments of which are in our herbarium, the friendly gift of Prof. H. Humbert of Paris. This material was allegedly collected in Ceará, Brasil, which does not immediately lie within the range of the Amazonian flora. The map in Mart. Fl. Bras. 14^1: 1857-1859, shows that Gardner left Jaicós in Piauhy, going directly to Crato, in southern Ceará, then following the valleys of the Rio Salgado and Rio Jaguaribe straight to Aracaty. I have not seen material collected in this range, and am unable, accordingly, to discuss *Gardner's* plant. It looks very close to *C. palanostigma,* and I question whether *"Gardner 1008"* is, after all, not a clerical error for *"Schomburgk 1008"*. I accept *C. cearensis* as a doubtful species, believing that later investigations will prove it to be *C. palanostigma*.

Croton huitotorum sp. nov.

Notis vegetativis in herbario sat cum *C. palanostigmate* Kl. convenit, etsi foliis minoribus videtur, maximis 12 cm. longis, 10 cm. latis, indumento subtus minus conferto. Flore ♀ differt: lobis intus valde hispidis; stylorum laciniis 10-12 gracilibus; ovario hispido ne-

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(*) The map in Schomburgk, Reise Guian. Orin. 1841 shows that this traveller and collector only bypassed the mouth of the Padauiri River on his way on the Rio Negro.

que lepidoto tomentosove. Flore ♂ differt: staminibus brevioribus, ca. 2.5 - 3 mm. longis, basi filamenti haud incrassatis.

COLOMBO-PERUVIAN BORDER: Peru, Depto. Loreto: Florida, Rio Putumayo, alt. 180 m. "Huitoto name: *Begoro-ey*", *Klug 2149*, 1931 (TYPE); PERU: Lower Rio Nanay, *Williams 644*; - Iquitos, alt. 120 m., *Williams 7979*.

This is one of the forms the status of which may remain forever controversial. It is exactly intermediate between *C. palanostigma* and *C. Killipianus*, and might well be used to bring these two species together, although it is clear on all intangibles, and the range, that *C. Killipianus* and *C. palanostigma* are not conspecific. Several years of study of *Croton* have convinced me that the rank of a form in this genus may as much depend from convenience than from other factors. In all too many cases a form is worthy of specific rank not because it has strong characters of its own, but because it cannot be attached to others without bringing about sweeping subordinations which the characters of the extremes involved prove to be undesirable.

Croton huitotorum may be looked for in the Putumayo and Caquetá regions of Colombia.

Croton Killipianus Croiz. in Jour. Arnold Arbor. 21: 90. 1940.

I have seen no other specimen outside of the type, *Lawrance 588*, Boyacá, region of El Umbo, alt. ca. 1300 m. This species differs from *C. huitotorum* in the more delicate ♀ flower, in the styles cleft into finer laciniae, in the smaller ♀ calyx and lobes, in the presence of minute petals in the ♀ flower, and in the filament of the stamen dilated at base as in *C. palanostigma*. The indumentum is almost evenly thin on both faces of the blade, moderately scabrid. The blade tends to be 3-lobed, the middle lobe being sometimes lobulate-repand. The type-locality appears to have an interesting flora of its own.

Croton Smithianus Croiz. in Jour. Arnold Arbor. 21: 93: 1940.

The type-locality is the Mesa de los Santos, alt. 1500 m., Dep. Santander. The exceedingly heavy indumentum of the young growth and petiole, the manifest accrescent calyx, the very scabrid upper surface of the leaf-blade, the occurrence of a great majority of 3-lobed leaves point to a sharply marked form, which is certainly not *C. Purdiei*, and does not belong in the affinity of *C. gossypiifolius* Vahl. *Killip & Smith 20822*: Norte de Santander, vicinity of Chinácota, alt. 1400 m., might belong here. The lone ♀ flower extant on it, however, does not readily suggest the peculiar cupuliform, broadly-lobed ♀ calyx of Subsect. *Palanostigma*.

Croton chocoanus sp. nov.

Arbor 6-8-metralis. Foliis ad 15 cm. longis, 12 cm. latis, 3-lobis, margine manifeste denticulatis, basi late rotundato-subcordatis, indumento dissito stellato fere utrinque aequo jure adspersis subscabridis, nervis ca. 7-jugis, primo jugo maximo, in lobos laminae saepissime abeunte, margine externa valde ramoso, petiolo 7-10 cm. longo; glandulis ad radicem petioli in lamina posticis 2 patelliformibus subsessilibus, glandulis fere similibus minoribus hic inde in laminae facie supera dispersis. Inflorescentia juniori vix ad 7 cm. longa, vix ad autopsiam rite idoneam, floribus ♀ carente. Floribus ♂ (in alabastro) ca. 1.5 mm. magnis, staminibus ca. 15.

COLOMBIA: El Chocó, Istmina, on Rio San Juan, alt. ca. 75 m., *Killip 35482* (TYPE in herb. Arnold Arb.).

To describe as new a species of *Croton* on material lacking female flowers is admittedly unorthodox. However, I find no species to which I can attribute this collection; my earlier determination as *C. Killipianus,* made on the nature of the indumentum, is untenable under a critical study of the whole Subsection.

The region in which this plant was collected is well known for its endemism. In crediting this species to Subsect. *Palanostigma* I rely upon intangibles of habit and foliage: it may well prove to belong elsewhere once its female flower is known.

Croton sibundoyensis sp. nov.

Arbuscula vel frutex, innovationibus indumento stellato pallide ochraceeo vel lutescente grosso brevique nempe sabulosis, citius glabratis. Foliis ovatis, firme chartaceis vel subcoriaceis, ca. 7-11 cm. longis, 4 - 6.5 cm. latis, margine integris subcartilagineis, supra citissime glabris, subtus indumento stellato cinereis vel cineraceo-ochraceis laxius tomentosis, nervis ca. 7-9-jugis, primo jugo sat amplo, glandulis tubulosis ad laminae basim ca. 4, petiolo 2-4 cm. longo, glabrescente. Inflorescentia spicata, luteo-tomentosa. Flore ♂: perianthio ca. 4 mm. lato, pedicello ca. 4 mm. longo, staminibus ca. 17, petalis lobisque subaequilongis. Flore ♀: perianthio ad basem in lobis 5 triangularibus ca. 3 mm. longis, totidemque basi latis, subglabres-

centibus diviso, glandulis oppositilobis magnis bilabiatis; ovario grossius verrucoso-tomentoso ca. 4 mm. magno, colore pulchre badio, stylis 3 quove semel partito.

COLOMBIA: Putumayo: Valle de Sibundoy, alta cuenca del Rio Putumayo, junto a San Francisco, 2200 m. alt., *Cuatrecasas 11568* (TYPE in Herb. Nac. Colomb.).

This species represents in the flora of Colombia a southern Andean element, being closely related with the group of *C. quadrisetosus* Lam., from Peru, and *C. coriaceus* HBK., from Ecuador. So far as I know at present, its nearest Colombian ally is *C. bogotanus* Cuatr., of which I have seen a topotype, *Cuatrecasas 8008*: Macizo de Bogotá: Quebrada de La Vieja, 2750 m. alt. *Croton sibundoyensis* well differs from *C. bogotanus,* (a) In the slender pedicel of the female flower, the styles of which are cleft but once; (b) In the indumentum which is more argillaceous, apparently less persistent; (c) In the very nearly entire margin of the leaf; (d) In the smaller male flower. The material in my hands is fragmentary.

Croton boavitanus sp. nov.

Specimen adest valde mancum, vix frustulo melius. Notis vegetativis totis species nostra cum *C. pungenti* Jacq. bene congruit, at facillime separatur notis sequentibus, (a) Indumentum est mollius, trichomatibus laxioribus, fere intricato-lanulosis in laminae facie inferiori; late fasciculatis stellatisve in superiori; (b) Capsula pulchre lutea aurantiacave, epicarpio non ut in *C. pungenti* laevi, sed tuberculis tactu oculisque valde obviis asperato; (c) Perianthii ♀ lobis late triangularibus, quam *C. pungentis* paullo majoribus; (d) Semine apice (i. e. sub caruncula) late truncato, basi valde acuminato, 4.5 mm. longo, 3 mm. apice lato.

COLOMBIA: Boyacá: vicinity of Boavita, alt. 2250 m., *Cuatrecasas 1942* (TYPE in U. S. Nat. Herb.).

My first determination of this collection was tentatively near *C. pungens* Jacq. or *C. Purdiei* Muell.-Arg. Later investigation revealed that it differs from the former as indicated, thus tending to connect the Subsect. *Pungentes* with the Subsect. *Panamenses* in the sum of its characters. *Croton Purdiei* has a much larger capsule in fruit (not less than 10-15 mm. long, but here barely 6-7 mm.), and larger lobes at the female perianth. *Cuatrecasas 7928* from Cundinamarca, which

I have referred to a probable form of *C. pungens*, might actually belong here.

Croton Linnaeus

Sect. *Cyclostigma* (Kl.) Grisebach, descr. emend.

Sectio admodum vasta, species arboreas vel fruticosas amplectens, (ut videtur) utriusque orbis, nunc foliis magnis (ultra 10 cm.) nunc minoribus donatis, saepissime ovatis subintegrisve, interdum 3-5-lobatis vel lobulatis, numquam lepidotis vel revera metallicis. Calyce ♀ numquam accrescente, lobis lanceolatis linearibusve integris, saepissime vix ultra 5 mm. longis, discretis. Capsula laevi tomentosaque, interdum processubus minoribus asperata.

Species typica: *Croton panamensis* (Kl.) Muell.-Arg.

This is one of the largest aggregates under *Croton*, and may well be ultimately raised to subgeneric rank. As originally defined (Fl. Brit. W.-Ind. 42. 1859), it loosely applies to unrelated forms, artificially connected by characters of no validity outside of the herbarium. It will ultimately include forms from Madagascar (e. g., *C. platanifolius* Bak.) which, unfortunately, are not available for present study.

Section *Cyclostigma* is well represented in Colombia, and troughout the whole of tropical and subtropical America.

Subsect. **Panamenses** subsect. nov.

Arbores, foliis fere semper inter majoribus (ultra 10 cm. longis latisque) rarius lobatis, margine subintegris; capsula nec ultra 15 mm. longa lateque, saepissime minore.

Species typica: *Croton panamensis* (Kl.) Muell.-Arg.

This Subsection is typic for Sect. *Cyclostigma*. It may prove necessary in a later revision to raise it to sectional rank, treating as Subsections the aggregates under it distinct by differences in the size of the capsule (cf. *C. panamensis* and *C. Urucurana*), or by the nature of the leaf (cf. *C. gossypiifolius* and *C. ater*). This revision cannot be effected until material from Madagascar is available.

This Subsection is represented in Colombia by at least eight species. Notes and elucidatory data will be read under each species; the following key may prove useful for determination:

A. Leaves ovate, entire or subentire, never 3-5-lobed.

B. Leaves when fully developed markedly tomentose, at least on the lower surface.

C. Calyx-lobes of ♀ flower broadly ovate to ellipsoid; indumentum persistent even on upper surface of the blade, heavy to very heavy underneath. Capsule subsessile. Cundinamarca to Western Venezuela .... **C. Purdiei**

CC. Calyx-lobes of ♀ flower lanceolate; indumentum not persistent above, moderately heavy, grayish to whitish underneath. Capsule manifestly pedicelled. Cundinamarca, Central Colombia .... **C. polycarpus**

CCC. Characters as in **C. polycarpus**, but growth on the whole less robust. Antioquia .... **C. magdalenensis**

BB. Leaves when full evolute strongly glabrescent to glabrous on both surfaces.

C. Blade smoothish; trichomes easily rubbed off, usually bearing a long appressed central hair. Cundinamarca .... **C. Mutisianus**

CC. Blade scabrid or subscabrid; trichomes minute, subargillaceous, without single central hair.

D. Blade scabrid; margin of blade with disciform glands. Western Boyacá (Mt. Chapón). .... **C. ater**

DD. Blade subscabrid; margin of blade without disciform glands. Putumayo. .... **C. Lechleri**

AA. Leaves 3-5-lobed.

B. Indumentum thick, Northern Colombia at the coast, ? Boyacá to Western Venezuela .... **C. gossypiifolius**

BB. Indumentum thin. Central and Western Colombia, Tolima, Cauca and El Valle .... **C. hibiscifolius**

Croton Purdiei Muell.-Arg. in Flora 47: 483. 1864; in DC. Prodr. 15^{2}: 535. 1866.

(?) *Croton callicarpaefolius pubescens* Muell.-Arg. in Linnaea 34: 85. 1865; in DC. Prodr. 15^{2}: 532. 1866. Syn. Nov.

The position of this species is uncertain on account of the comparatively large and obtusish lobes of the female flower. It may connect Subsect. *Panamenses* with the group, as yet unnamed, which includes *C. caldensis* Muell.-Arg., from Brazil, and *C. speciosus* Muell.-Arg., from Venezuela, the lobes of the female calyx being well developed in this group even in anthesis. *Pérez-Arbeláez 85*: Cundinamarca: Isla de la Laguna de Fúquene, is an excellent match of the isotype in our herbarium, this suggesting that the type-locality, vaguely given by Mueller-Argoviensis as "In Nova Granata" may actually be the north of Cundinamarca.

Croton Purdiei Muell.-Arg. var. **santurbanensis** var. nov.

A *C. Purdiei* **typico** var. nov., qui capsula ca. 10-11 mm. longa, indumento haud pannoso subhispidoque gaudet, capsula discedit ad 15 mm. longa, indumento grossius conferto sat hispido.

Dpto. de Santander: Western slopes of the Páramo de Santurbán, toward Tona, alt. 2200-2800 m., *Killip & Smith 19517* (TYPE).

This is a very distinct form, with a heavy indumentum and a rather large capsule, the calyx-lobes of the ♀ flower also being possibly smaller than those of the var. *typicus*. Better material may show that it is worthy of specific rank.

The plant from Western Venezuela (*Moritz 1660, Fendler 1221*: Estado Mérida, Tovar) sooner suggest var. *typicus* than var. *santurbanensis*, and requires further study.

Croton polycarpus Benth. Pl. Hartweg. 249. 1846; Muell.-Arg. in DC. Prodr. 15^2: 535. 1866.

The classic locality is Hacienda de Hato Frío, Popayán, which should be in the Department of Cauca. I have not seen material from this vicinity, but I am wholly unable to separate the holotype *Hartweg 1373*, which I have seen, from *Cuatrecasas 13578*: Cundinamarca, Cordillera Oriental, entre Sebastopol y Alto de las Escaleras, 2300-2400 m. In this species the leaves have a peculiarly ashen to yellowish-white indumentum at the lower surface, which is quite persistent. Good material from Cauca and Huila is needed.

Croton magdalenensis Muell.-Arg. in Flora 47: 484, 1864; in DC. Prodr. 15^2: 542. 1866.

Mueller-Argoviensis breaks this species in two trinomials, *leucoxanthus* ("In Nova Granata secus flumen Magdalenae (Jewise!), in regione bogotensi alt. 6000 ped. (Triana 3631! in hb. Hook.)"), and *glabratus* ("Prope Antioquia cum leucoxantho (Jewise! in hb. Hook."). The material I have seen indicates that even as *C. Holtonis* Muell.-Arg. may be a variety of *C. ferrugineus* HBK. (see Caldasia II, 10: 429. 1944), so probably is *C. magdalenensis* a form of *C. polycarpus*. There is here a suggestion of distribution which begins in Ecuador (*C. sordidus* Benth., *C. coriaceus* HBK., *C. Rimbachii* Croiz.), extends to the Cauca and beyond to Cundinamarca (*C. polycarpus* Benth), and eventually reaches Antioquia (*C. magdalenensis* Muell.-Arg., and (?) *C. aristophlebius* Croiz.). Since this distribution is most likely complicated by altitudinal factors, and local ambiental conditions, little can be done to elucidate its details with scanty material in herbarium. I believe that *C. magdalenensis* var. *leucoxanthus* is well represented by *Hermano Daniel 2617*: Antioquia, Jericó. I am altogether doubtful as to the status of *Triana 3631,* and the glabrous specimen of *Jewise,* cited by Mueller. It should be noticed that *C. sordidus,* which Mueller-Argoviensis located (in DC. Prodr. 15^2: 533. 1866) "In Colombia, in Hacienda de Iravi, juxta pagum Prucho prope Quito" is actually said by Bentham (Pl. Hartweg. 247. 1846) to have been collected at "Hacienda de Iravi, juxta pagum Perucho prope Quito". Perucho is right on the boundary between Pichincha and Imbabura, in Ecuador, being one of the classic localities of Hartweg. *Croton sordidus,* consequently, is to be excluded from the flora of Colombia pending a careful exploration of Nariño and southern Cauca.

Croton Mutisianus H. B. K. Nov. Gen. Sp. Pl. 2: 87 (70). 1817; Muell.-Arg. in DC. Prodr. 15^2: 542. 1866.

The status of this entity is altogether speculative. The isotype in the Paris Herbarium differs from *C. polycarpus* in having strongly glabrescent to glabrous undersurface of the leaf, with veins drying black. I match this with *Pennell, Killip & Hazen 8716*: Caldas, Rio Quindío, sobre Armenia, 1300-1500 m. The type-locality is "Locis apricis prope Santa Fé de Bogotá, 8220 ped.", and Kunth describes the undersurface of the leaf as "Subtus pilis stellatis pulverulenta et canescentia". Material which has these characters, and very nearly comes from the type-locality is *Cuatrecasas 8057-A*: Cundinamarca, Cuesta de Fusagasugá, 2000 m.; *Cuatrecasas 8198*: Cundinamarca, entre El Salto y El Colegio, 2100-2200 m. The evidence therefore, indicates that this plant may be more or less glabrous, the isotype I have seen having probably shed a great deal of its pubescence in time, or having been made pubescent while drying, the like *Pennell, Killip & Hazen 8716.* Careful field-observations are necessary to determine whether *C. polycarpus* is better than a variety of *C. Mutisianus.* Although adequate for purposes of determination, my material is as yet incomplete for a critical study.

Croton ater Croiz. in Jour. Arnold Arb. 21: 89. 1940.

This species is still known only from the original collection, *Lawrance 593*: Boyacá, El Umbo, Mt. Chapón. Its nearest affinities are not with the group of *C. polycarpus,* but with *C. Lechleri* Muell.-Arg. from the Putumayo and Amazonian Peru, and *C. Urucurana,* from Brazil.

Croton Lechleri Muell.-Arg in DC. Prodr. 15^2: 545. 1866; In Linnaea 34: 90. 1865 (as *C. Draco* Schlecht. *cordatus* Muell.-Arg.).

Here belong: *Klug 1831,* Putumayo, Umbría, and: *Cuatrecasas 11018,* Frontera Colombo-Ecuatoriana, Rio San Miguel.

This species has close affinities with *C. Urucurana* Baill., of Eastern and South-Eastern Brazil, and obscure relationships with *C. erythrochilus* Muell.-Arg., of Peru. *Spruce 4582* and *Poeppig 1846,* which Mueller cites under *C. draconoides* (in op. cit. 545), are almost certainly *C. Lechleri.* The third specimen of *C. draconoides,* namely *Sellow s. n.* "Inter Bahiam et Victoriam" in Brazil, which I have seen, is questionable, and cannot be interpreted without better collections from the type-locality. *Krukoff 2029*: Brazil, Maranhão, near Victoria, region of River Mearim, belongs in this vicinity, and may be a distinct species. Unfortunately, my material lacks female flowers or fruits.

Croton gossypiifolius Vahl Symb. Antill. 2: 98 Pl. 49. 1791; Muell.-Arg. in DC. Prodr. 15^2: 539. 1866 (quoad *genuinus,* excl. var.).

The range of this species, and its nearest allies in South America, is to the north of a line drawn straight between the island of Trinidad, and the southern boundary of Departamento El Valle, in Colombia. Pittier has identified the Venezuelan form as *C. confusus* (in Jour. Wash. Acad. Sc. 20: 6. 1930; loc. class.: Estado Yaracuy), but I cannot find reliable characters to separate his species from that of Vahl, even as a variety. My impression is that *C. gossypiifolius* has its center of dispersal in Venezuela, possibly in Western Venezuela; accordingly, the type-locality, Trinidad, lies at the extreme eastern limit of the range but has no phytogeographic significance of its own. *Fendler 1222*: Estado Mérida, Tovar, as a matter of fact, is cited by Mueller-Argoviensis under var. *genuinus,* which I believe to be quite correct. *Croton ochromaefolius* Rusby (Descr. New Sp. 45. 1920; loc. class.: "Valparaíso, 4500 ft." near Santa Marta) would seem to be based on an exceptionally robust shoot of Vahl's species. To elucidate *C. gossypiifolius* in the Colombian range good material, including ripe capsules and seeds, should be available from Norte de Santander and Santander, possibly Boyacá.

Croton hibiscifolius H. B. K. Nov. Gen. Sp. Pl. 89 (71). 1817; Muell.-Arg. in Linnaea 34: 88. 1865; in DC. Prodr. 15^2: 538. 1866 (pro var. *C. gossypiifolii* Vahl.).

The type of this species was collected between Espinal and Ibagué, Tolima, in September 1801 (*) and its leaves are described by Kunth as "Quinqueloba, grosse sinuato-dentata... supra pilis stellatis molliter pubescentia, subtus pilis stellatis tenuissime canescenti-tomentosa". Collections in full fruit from the type-locality are needed to decide whether this plant is nearer *C. gossypiifolius*, or the form from El Valle and Cauca published by Mueller-Argoviensis as *C. gossypiifolius heterophyllus* (in DC. Prodr. 15^2: 539. 1866), which is abundantly represented in our herbarium (*Holton 868*: La Paila; *Pennell & Killip 6113*: El Valle, Rio Amaime; *Pennell, Killip & Hazen 8454*: El Valle, east of Zarzal; *Lehmann 5111 and 8386*: Cali and Buenos Aires; *Pérez-Arbeláez & Cuatrecasas 6116*: Cauca, Timbío). In my opinion, this form is worthy of specific rank, and might very well be the true *C. hibiscifolius* HBK. It should further be noticed that Mueller's variety is a reduction of *C. heterophyllus* HBK. (Nov. Gen. Sp. Pl. 2: 88 (70) 1817) originally collected in "Locis apricis prope Santa Fé de Bogotá, alt. 1370 hexap.". There is every indication that *Triana 3636* "In Nova Granata bogotensi prope La Mesa, alt. 5500 ped.", type-specimen of *C. Funckianus hibisciformis* Muell.-Arg. (in DC. Prodr. 15^2: 546. 1866), is fully conspecific with the type-material of *C. heterophyllus*. In conclusion, the following distributional outline is suggested merely as a preliminary toward setting aright the much involved classification of this group:

C. hibiscifolius: Tolima, El Valle and Cauca.
    This is *C. Funckianus* auct. non Muell.-Arg.
C. heterophyllus: Cundinamarca, (?) Boyacá, (?) Santander, (?) Norte de Santander.
    = *C. Funckianus hibisciformis,* the type-trinomial of *C. Funckianus*.
    (?) *C. gossypiifolius* var.
C. gossypiifolius: Venezuela to Magdalena, in Colombia.
    = (?) *C. ochromaefolius, C. confusus*.

It will readily be seen from this outline that the plant of Tolima, typifying *C. hibiscifolius,* has capital significance for a final disposition of the entire group. If it should prove to be synonymous with the plant of Cundinamarca, the form of El Valle and Cauca ought to be renamed.

(*) See Sprague's account of Humboldt and Bonpland's Colombia itinerary in Kew Bull. 1926: 23-30. 1926.

The classification of Mueller-Argoviensis for this group (under C. *gossypiifolius,* as cited above) is quite unreliable. His var. *stipularis* is a mixture of *C. Draco* Schlecht. (Mexico), and *C. panamensis,* or its forms (Costa Rica).

Subsect. **Pungentes** subsect. nov.

Arbusculae vel frutices, foliis saepissime nec ultra 8 cm. longis latisque, numquam lobatis, margine subintegris integrisve; capsula vix ultra 10 mm. longa vel minore, saepissime quoque sub fructu sessili vel subsessili.

Species typica: *Croton pungens* Jacq.

This Subsection is represented in Colombia, so far as known at present, by *C. pungens* Jacq. (*C. timotensis* Pittier) and some of its forms (see Caldasia II, 10: 425. 1944). It is near Subsect. *Panamenses;* it essentially contains depauperate forms, with shrubby habit, and small leaves.

Subsect. **Leptostachyi** subsect. nov.

Arbusculae vel frutices in plurimis cum Subsect. *Pungentibus* congruentes sed foliis saepissime minoribus, elongatis neque ovatis, vulgo ambitu ellipticis vel subellipticis; floribus ♀ minimis distincti.

Species typica: *Croton leptostachyus* HBK.

This Subsection is as comprehensive, if not more so, than the preceding, and is widespread all over South America. Its limits toward Subsect. *Pungentes* are not easily defined, representing as it does a further evolution away from the Subsect. *Panamenses* in the direction of depauperate forms, with narrowly elongate, not truly ovate, leaves, and small female flowers. It is well represented in Colombia by the complex of *C. leptostachyus* and *C. ferrugineus* (see Caldasia II, 10: 426 *et seq.* 1944), and by *C. rhamnifolius* which occurs along the Colombian Caribbean shore.

It may be necessary to remark here that the classification of Pax & Hoffmann (in Engl. & Prantl, Nat. Pflanzenf. 19 (c): 83-87. 1931) does not afford a trustworthy basis for an elaboration of *Croton.* This classification is a compilation from old sources, consisting of artificial groups, and is not always reliable from the nomenclatural standpoint. It will be noticed, for instance, that Pax & Hoffmann credit Grisebach with having published Subsect. *Cyclostigma.* This is an error, for Grisebach published this name as Section.